

A vertical photograph on the left side of the slide shows a dark aircraft in flight against a deep blue night sky. The aircraft is blurred, suggesting motion. At the bottom of the image, the tops of several airport light towers with glowing orange lights are visible.

## **NASA 3<sup>rd</sup> Integrated CNS Technologies Conference and Workshop Conference May 21, 2003**

**SITA ATS AIRCOM Data  
Link Services and What's  
Next?**

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# Overview

- **ACARS/ATN Background**
- **AIRCOM Datalink ACARS Services**
- **ATN AIRCOM Services**
- **ATS AIRCOM Services**
- **ATS AIRCOM Systems**
- **What's Next**
- **Conclusion**

# ACARS/ATN Background

- **Aircraft Communications Addressing and Reporting System (ACARS) Data Link**
  - Initially AOC
  - AOC use continues to expand
  - ATS use is evolving
- **Continued Growth in both AOC and ATS use since ACARS inception**
- **Industry has chosen the ATN as the next generation aeronautical datalink communications architecture**
- **ICAO has developed and overseen the validation of ATN and associated air/ground subnetwork standards**
- **AOA has been adopted by the industry as an interim step towards ATN to enable air/ground capacity improvements**

# Digital ATIS Available for Various Locations in these Countries

- Australia
- Austria
- Bahrain
- Canada
- China
- Denmark
- France
- Germany
- Ivory Coast
- Japan
- Korea
- New Zealand
- Norway
- Portugal
- Singapore
- Sweden
- Switzerland
- Thailand
- United Kingdom
- US

# **PDC or DCL, OCL, TWIP, DDTC Available at Various Locations in these Countries**

## **PDC**

- **Australia**
- **China**
- **United States**

## **DCL**

- **Belgium**
- **Denmark**
- **France**
- **Ivory Coast**
- **Korea**
- **Sweden**
- **United Kingdom**

## **OCL**

- **United Kingdom**
- **Canada**

## **TWIP**

- **United States**

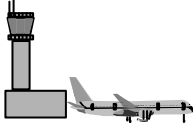





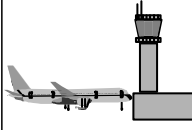
## **DDTC**

- **United States**

# SITA FANS Customers



# Airline Data Link Applications

Home Station 						Remote Station 
Park/Taxi	Take-Off	Depart/Climb	En Route	Approach	Land	Taxi/Park
<ul style="list-style-type: none"> <li>• Out</li> <li>• Link/Test Clk</li> <li>• Updates</li> <li>• Fuel Reports</li> <li>• Crew Info</li> <li>• Delay Reports</li> </ul> <div>From Aircraft</div>	<ul style="list-style-type: none"> <li>• Off</li> <li>• Engine Data</li> </ul>	<ul style="list-style-type: none"> <li>• Engine Data</li> </ul>	<ul style="list-style-type: none"> <li>• Position Reports</li> <li>• Weather Reports</li> <li>• Delay Information</li> <li>• ETA</li> <li>• Performance Reports</li> <li>• Voice Requests</li> <li>• Engine Data</li> <li>• Maintenance Information</li> <li>• Oceanic ADS</li> </ul>	<ul style="list-style-type: none"> <li>• Gate Info Requests</li> <li>• ETA</li> <li>• Special Requests</li> <li>• Engine Data</li> <li>• Maintenance Information</li> </ul>	<ul style="list-style-type: none"> <li>• On</li> </ul>	<ul style="list-style-type: none"> <li>• In</li> <li>• Fueling Data</li> <li>• Crew Information</li> <li>• Fault Data</li> <li>• Fuel Reports</li> </ul>
<ul style="list-style-type: none"> <li>• PDC</li> <li>• ATIS</li> <li>• DDTC</li> <li>• Weight &amp; Balance</li> <li>• Flight Plans</li> </ul> <div>To Aircraft</div>		<ul style="list-style-type: none"> <li>• Weather Reports</li> </ul>	<ul style="list-style-type: none"> <li>• Weather Reports</li> <li>• Re-routing Information</li> <li>• TWIP</li> <li>• Oceanic Clearances</li> </ul>	<ul style="list-style-type: none"> <li>• Gate Information</li> <li>• Passenger Information</li> <li>• Crew Information</li> </ul>		

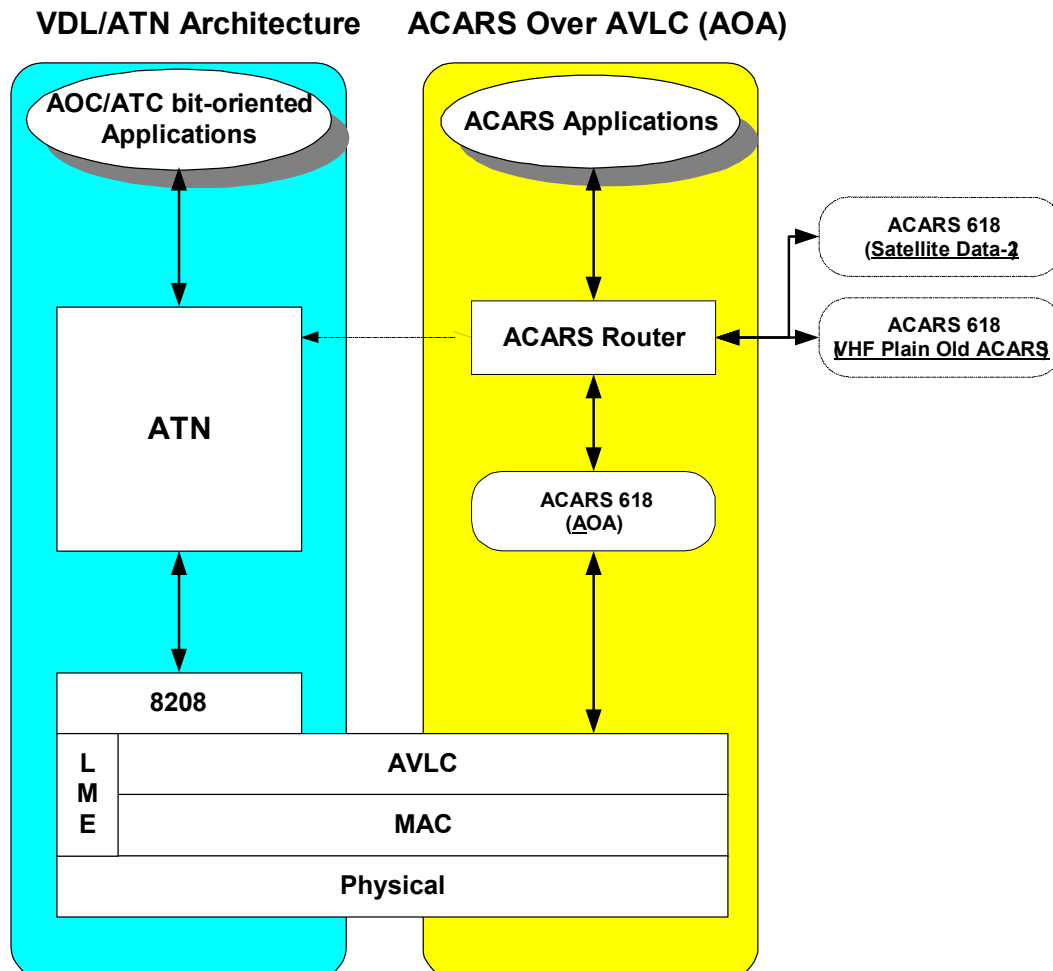
# VDL Service Performance



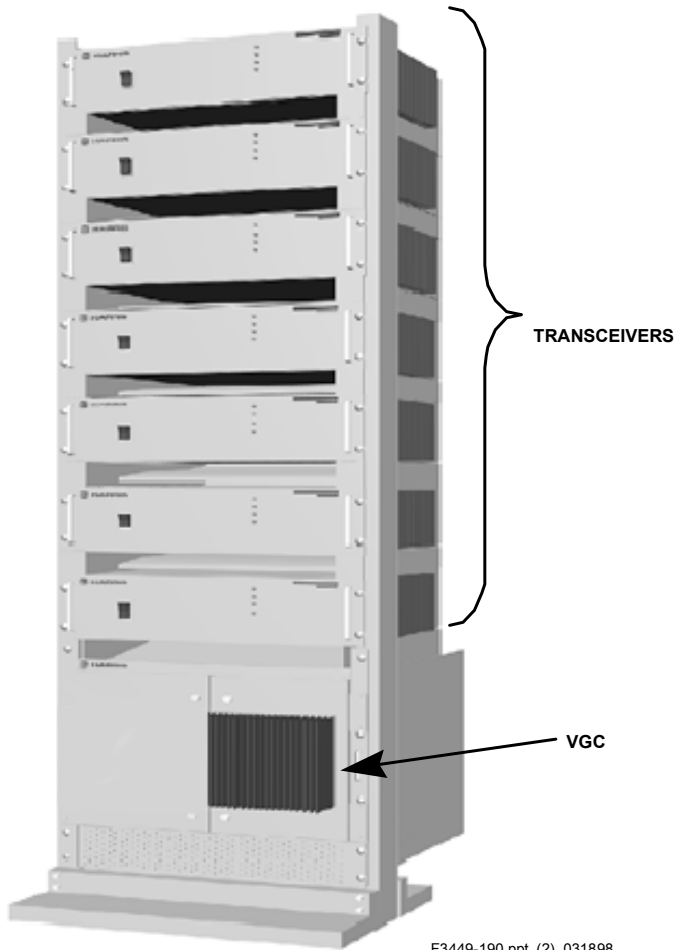
- One VDL channel provides a 10 to 20 times capacity increase over one ACARS channel



# VDL/AOA/ATN



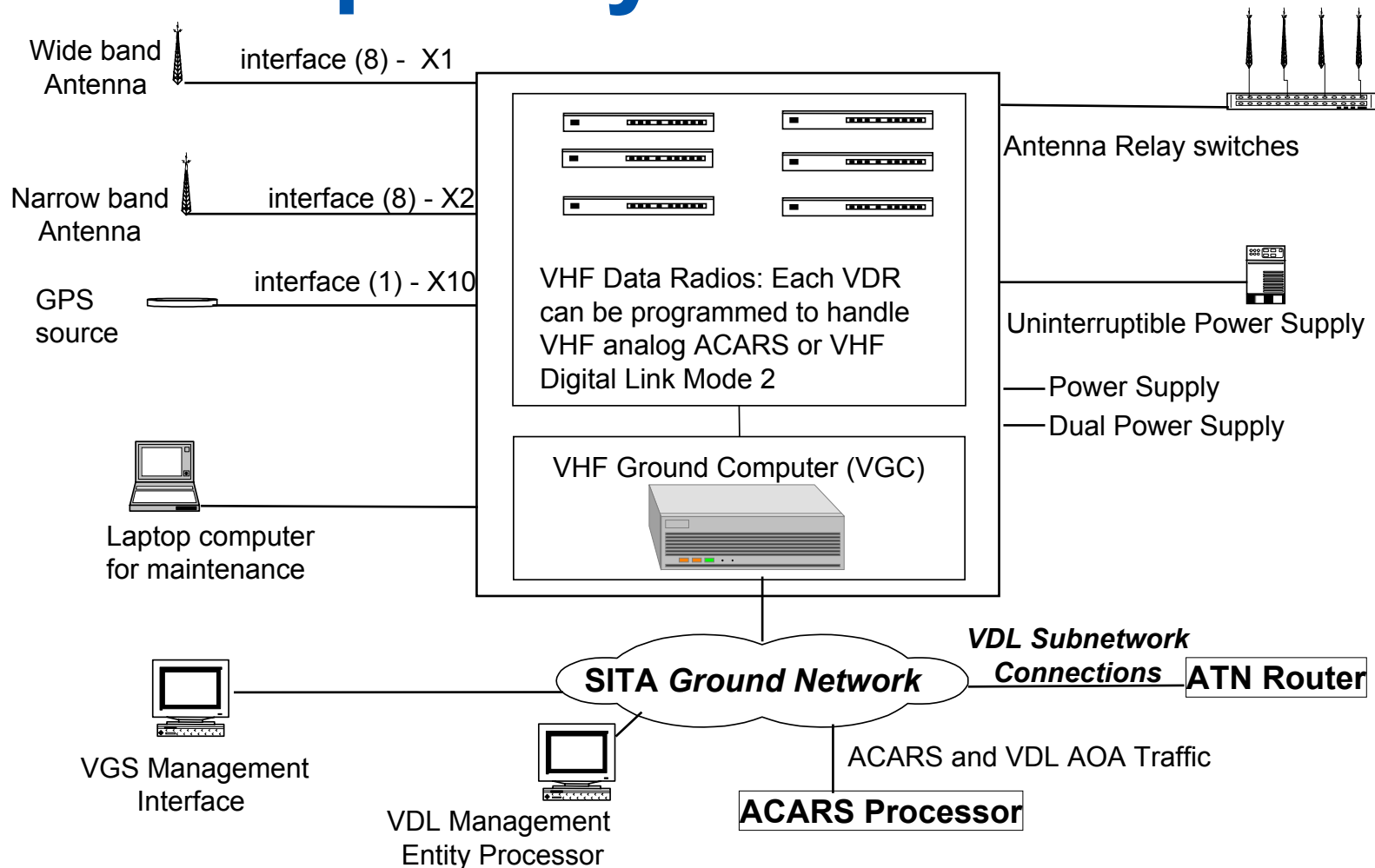
# SITA Infrastructure Upgrade



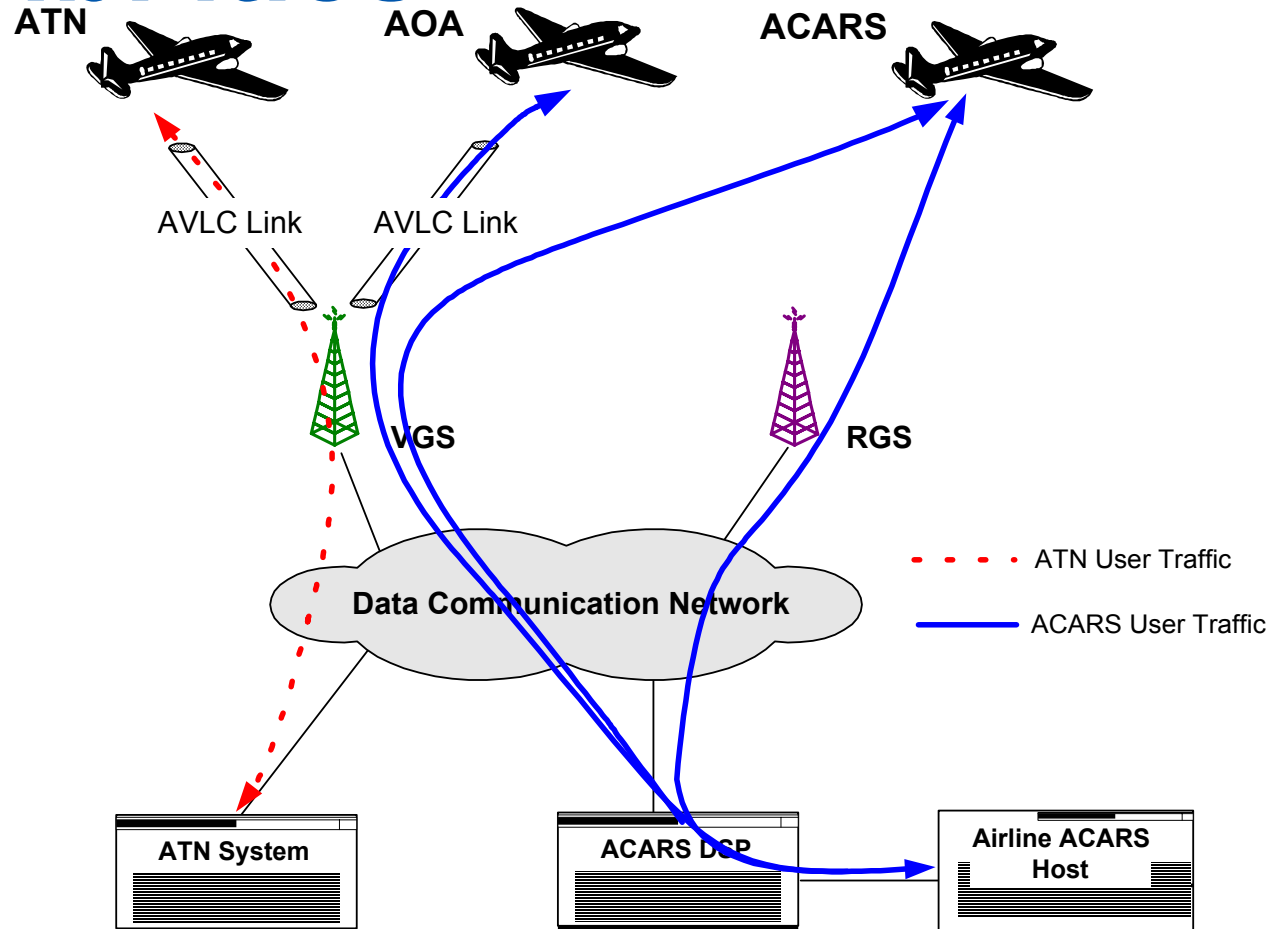
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- Harris contracted to produce VGS according to SITA specifications
- VGS can simultaneously support
  - ACARS
  - VDL ACARS over AVLC (AOA)
  - VDL Mode 2/ATN
  - VDL Broadcast

# SITA VDL Ground Station developed by Harris



# VHF Communications Flow Possibilities



# AIRCOM Data Link ACARS Services

- **VHF *AIRCOM***
- **Worldwide Coverage including North America:**
  - 735 VHF Radios in 164 Countries used by close to 5000 aircraft from over 100 airlines exchanging 400,000+ messages daily
  - 142 Ground Stations in US
  - 38 Ground Stations in Canada
  - 13 Ground Stations in Mexico
- **Satellite *AIRCOM***
  - Provides Worldwide Coverage

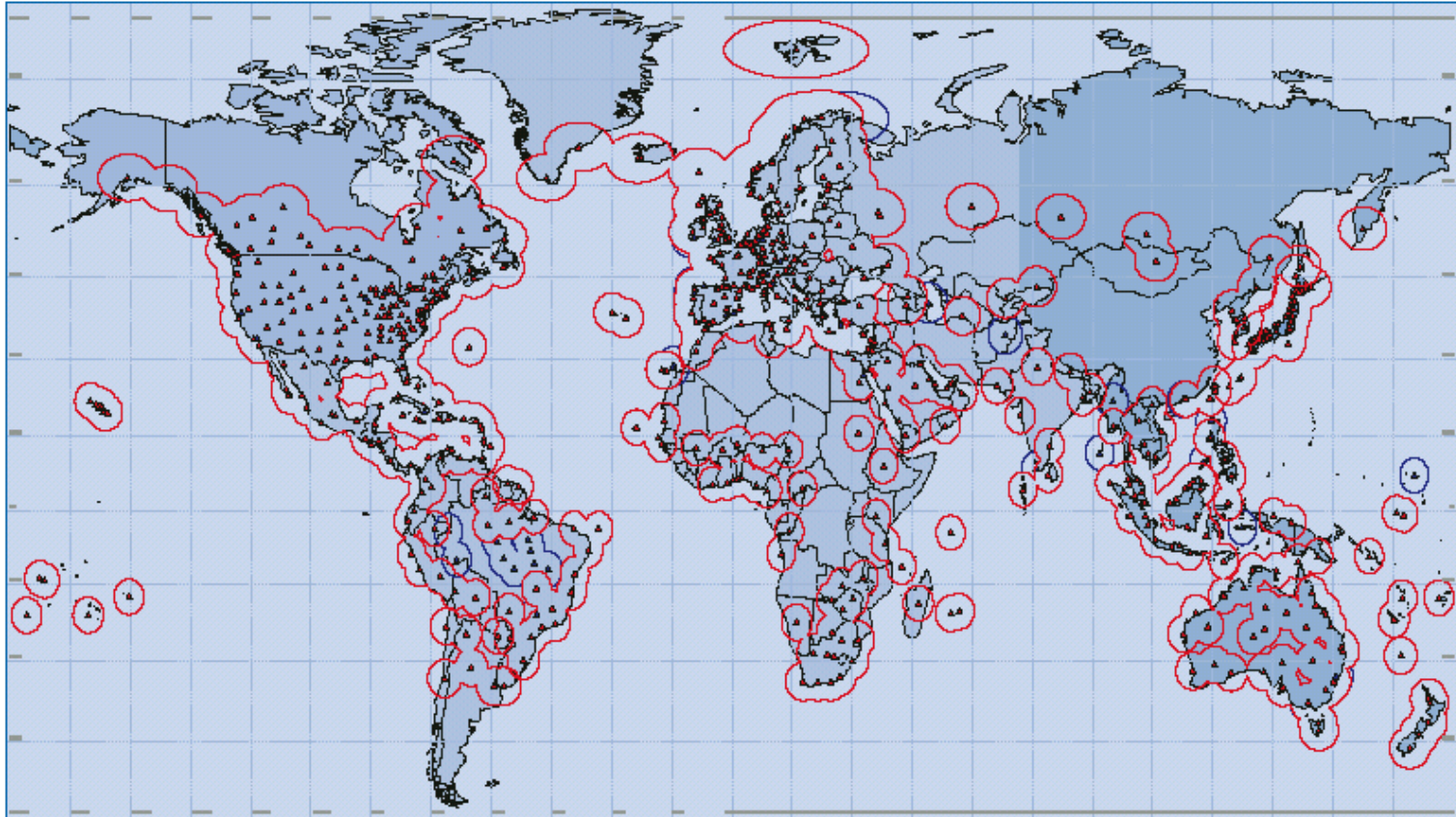
# AIRCOM Data Link ACARS Services over VDL Mode 2

- **VDL *AIRCOM* (VDL Mode 2/AOA)**
  - Launched May 2001
  - Successful Flight test with Airbus in October 2001
  - Participation in EuroVDL
  - Four airlines now using operationally
- **22 VDL Sites On-Line**
  - See Coverage Map later in presentation
  - 2 in US-Miami and ATL

# ATN AIRCOM Services

- **VDL Mode 2/ATN**
  - Initial ATN Service will be deployed to meet customer requirements
  - Successful Flight Tests with Eurocontrol in 2002-CPDLC messages exchanged end-to-end
  - Plan to support major airline to support ATN/VDL testing-expect their avionics to be ready in 2004
- **Aeronautical Mobile Satellite Services (AMSS) Data-3**
  - Supported Successful Eurocontrol GACS trials with LH and BA

# Worldwide VHF AIRCOM ACARS Coverage\*



\* As of July 2002, Altitude 30,000 feet-On-line RGS\*\* are in red, planned are in blue

\*\* Some of the stations are actually the SITA next generation VHF Ground Stations, referred to as VGSs, which are capable of supporting VDL Mode 2



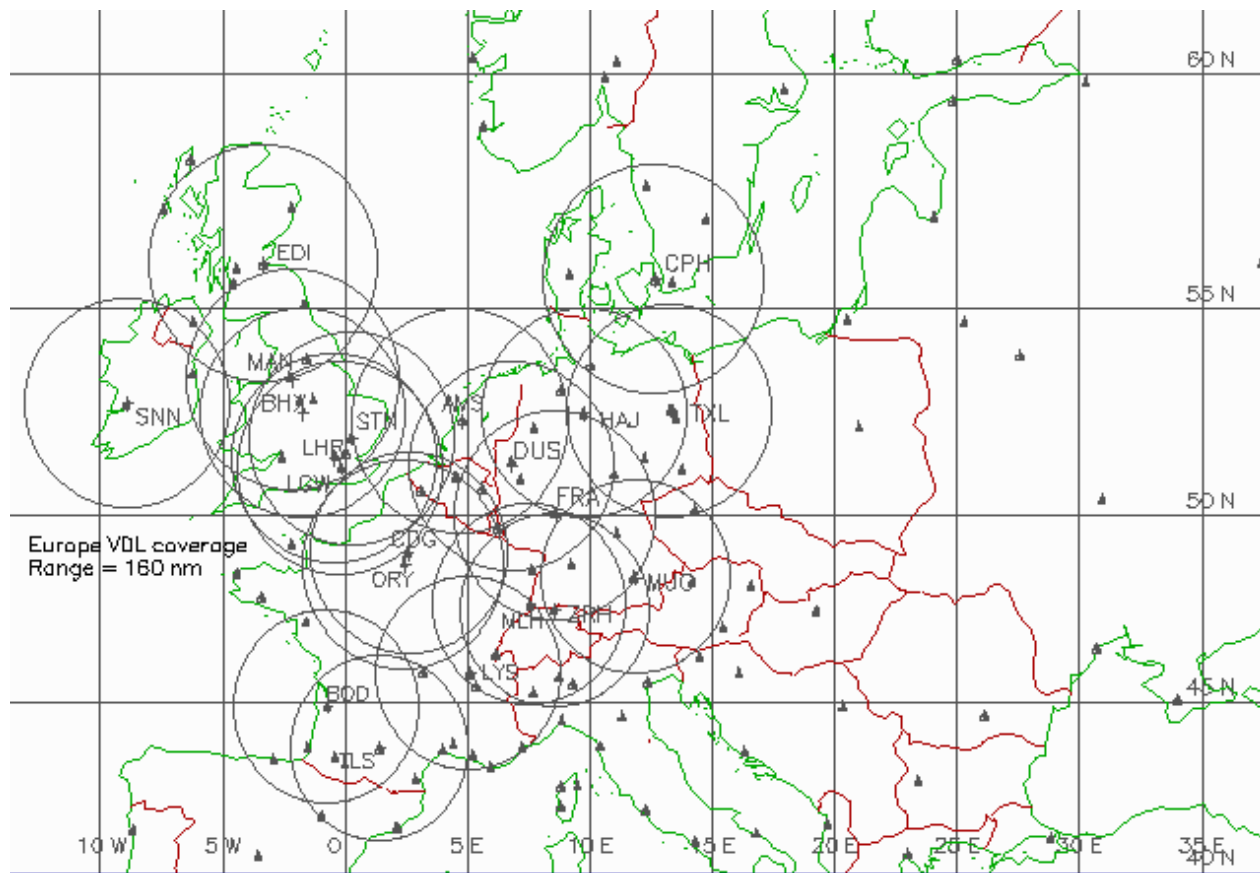
# Americas VHF AIRCOM ACARS Coverage\*



\* As of July 2002, Altitude 30,000 feet-On-line RGS\*\* are in red, planned are in blue

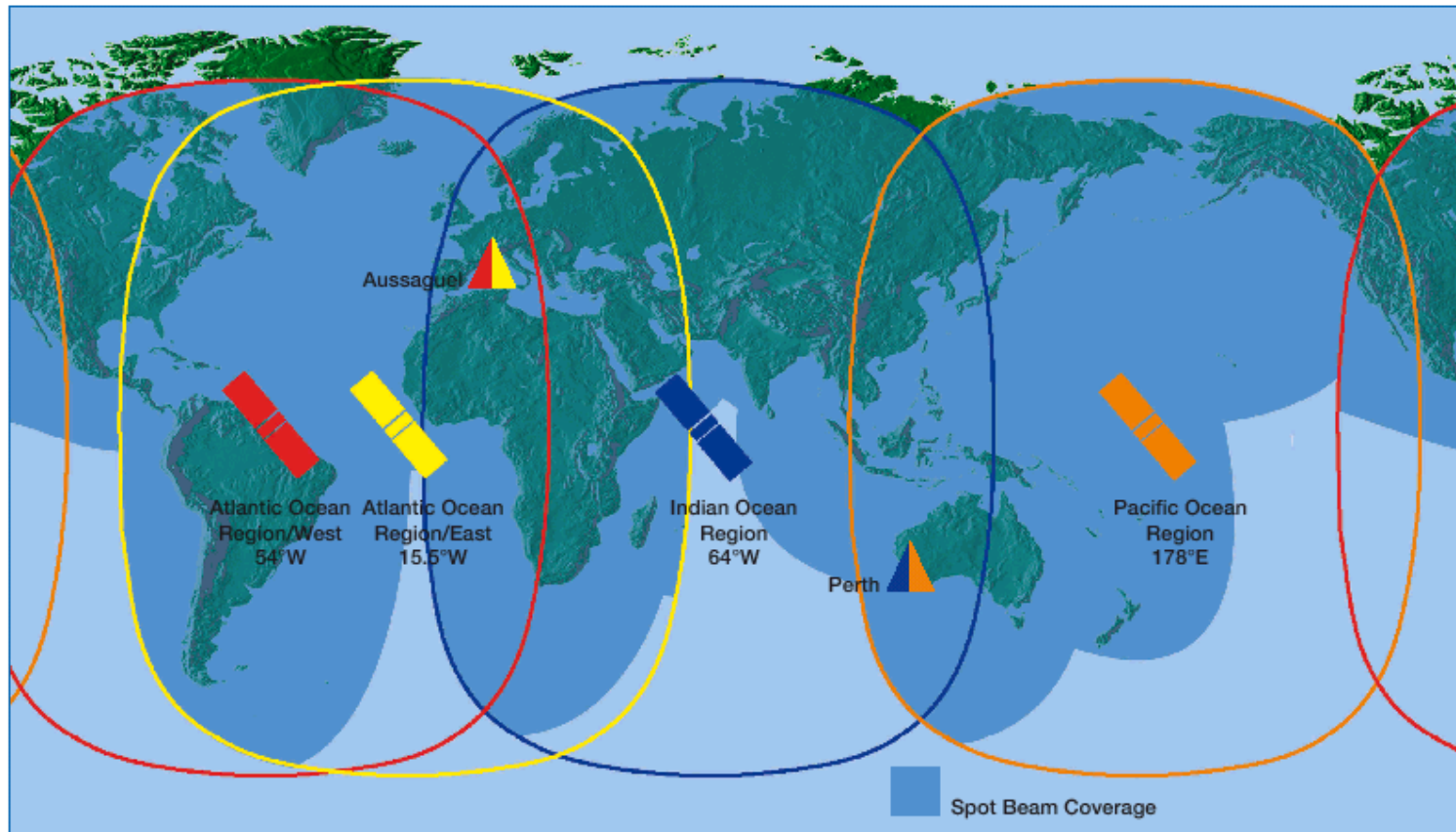
\*\* Some of the stations are actually the SITA next generation VHF Ground Stations, referred to as VGSS, which are capable of supporting VDL Mode 2

# Current VDL Mode 2 Europe Coverage Map



As of Feb 2003

# Worldwide Satellite AIRCOM Coverage



# ATS AIRCOM Services

- **Pre-FANS (ATIS, TWIP, PDC, DCL, OCL)**
- **D-ATIS Gateway**
- **FANS-1/A**
  - **Supports the FANS-1/A AFN, CPDLC, and ADS applications**

# ATS AIRCOM SYSTEMS

- **d-ATIS System (AIRCOM evatis)**
- **DCL System (AIRCOM clever)**
- **ACARS Gateway**
- **ADS/CPDLC Gateway**
  - Dual stack ATN/FANS gateway
- **ISMS/DDTC**
  - Integrated surface management system that includes implementation of the ACARS data link delivery of taxi clearance application.

# What's Next ?

# Next step after AOA/ATN CPDLC

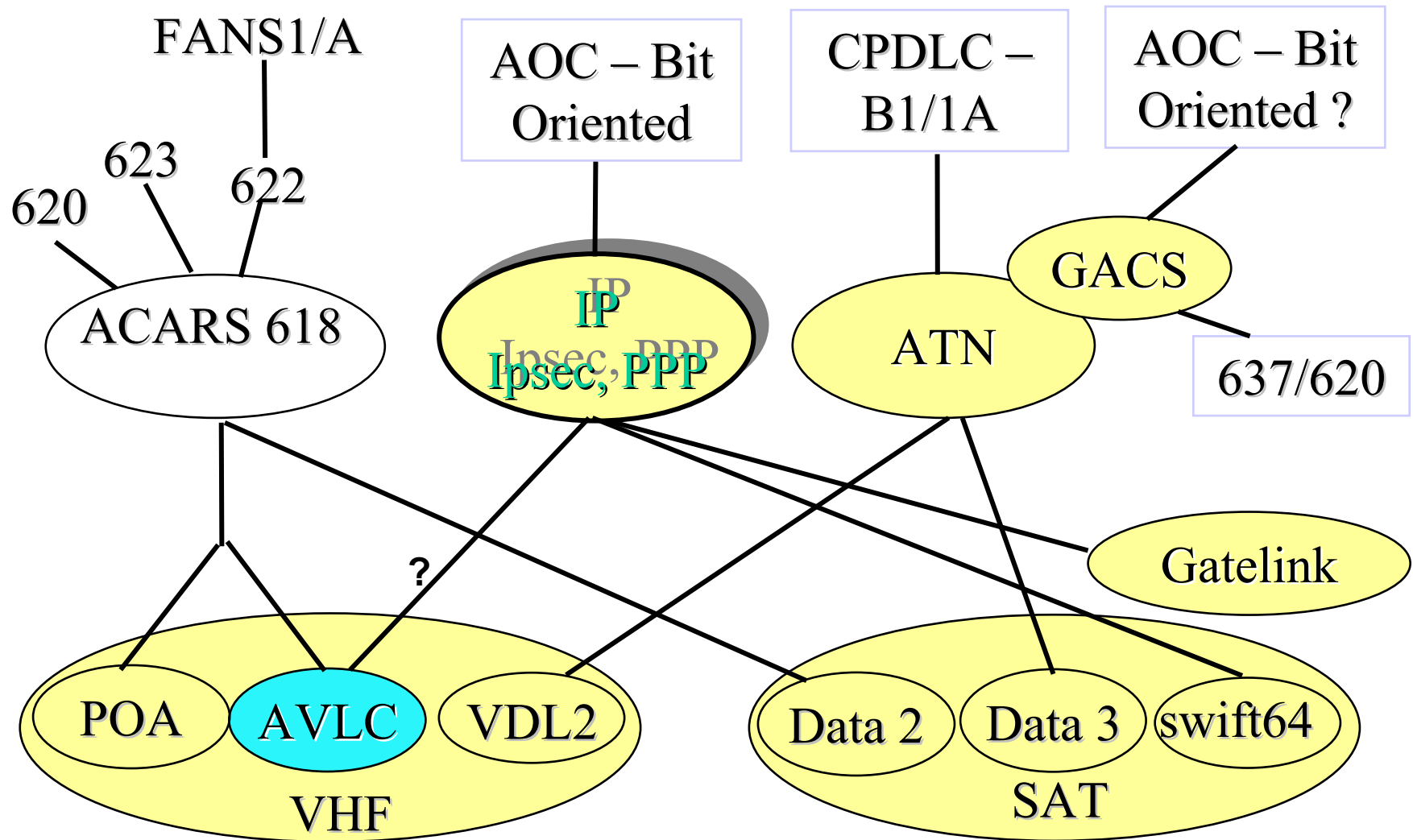
- SITA has completed development of VDL Mode 2 AVLC (AOA) support for ACARS and ATN/CPDLC.
- What is the next step for VDL Mode 2 data link ?
  - ATN GACS interface for AOC.
    - Enables ACARS applications to use an ATN router as per AEEC 637 specification
    - potential enabler for Bit-Oriented Applications, SITA supports Trials with Eurocontrol.
  - IP Solution for AOC ?
    - VDL/Satcom links that today support ACARS could also support an IP router for AOC in parallel with an ATN router for ATS ?

# IP/SATCOM

- **Satellite AIRCOM Swift64**
  - Services provide communication services for airlines' aircraft to access Ground systems via two-way high-rate TCP/IP link.
- **Two new Satellite services developed by INMARSAT**
  - the circuit-mode service (Inmarsat Swift64 Mobile ISDN Service referred to as MISDN) and the packet-mode service (Inmarsat Swift64 Mobile Packet Data Service referred to as MPDS).



# ? .....IP for AOC

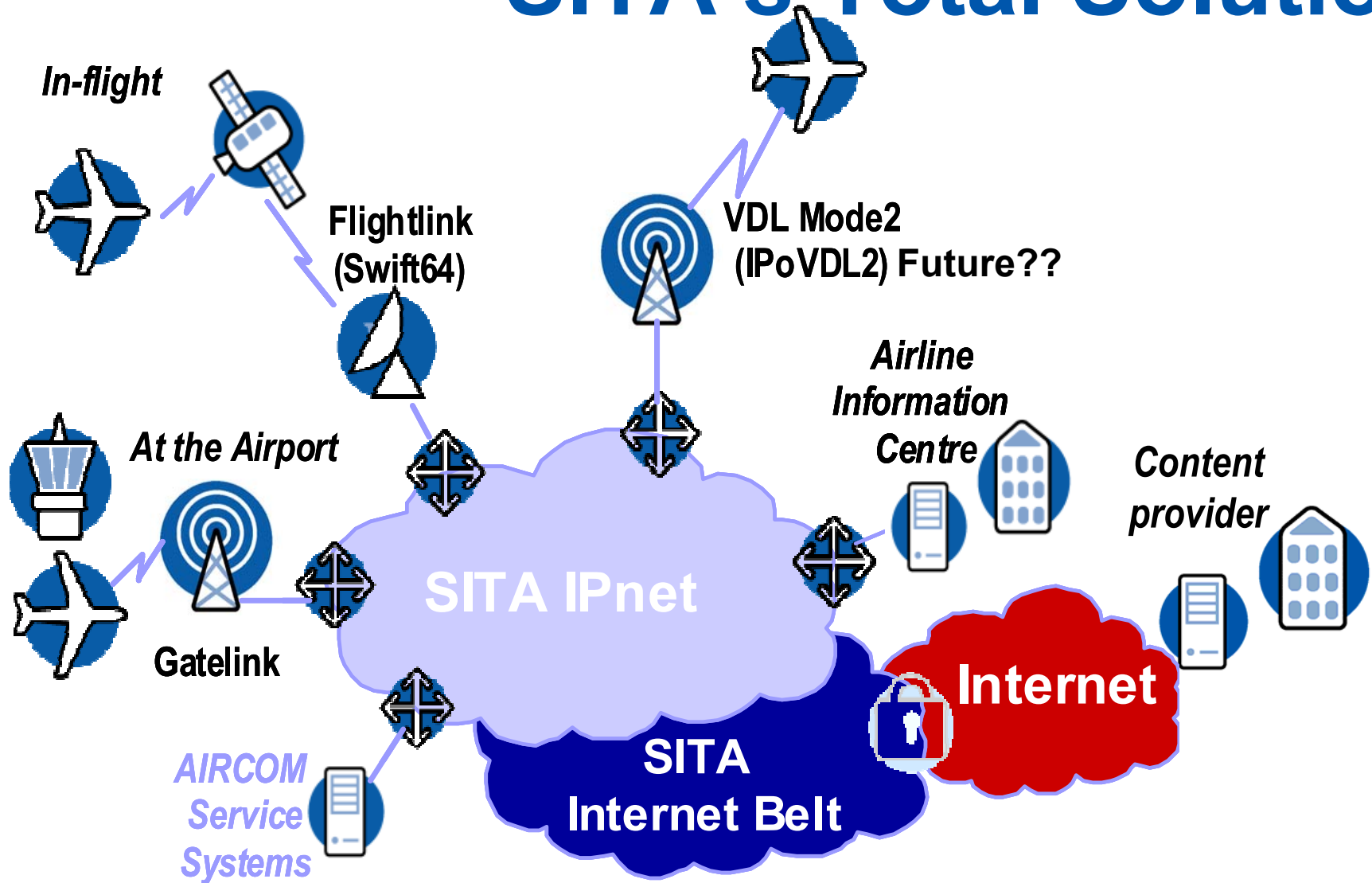


# SITA Aeronautical IP Solution

- SITA provides both candidate IP datalink services identified today, extending the reach of IP solutions to the aircraft
  - Services that support rapid and cost effective deployment of new passenger services
  - Services that support 3rd party applications while maintaining security
- AIRCOM FlightLink - Inmarsat Swift64 Service:
  - Deployed globally as an extension to SITA worldwide IP network
    - Incremental approach for the 3000+ aircraft with Aero-H systems
- AIRCOM Gatelink Solutions:
  - Deploy at hub (or major) airports based on customers' needs
    - Ideal complement to Swift64 for transfers of large data volumes at key content distribution locations (i.e. hub airports)
- Integrate AIRCOM FlightLink / AIRCOM Gatelink offerings to help customers realize the greatest benefit from their investment

# Aeronautical IP Communications

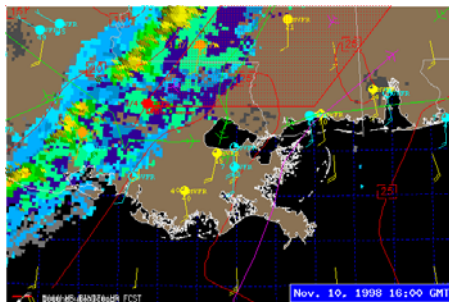
## SITA's Total Solution



# Software Applications

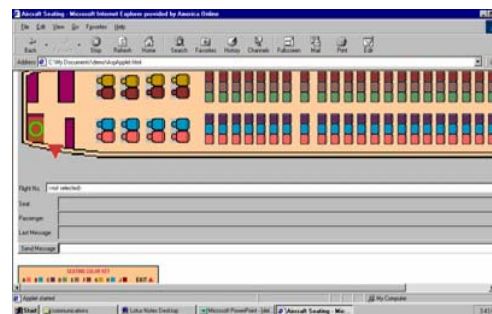
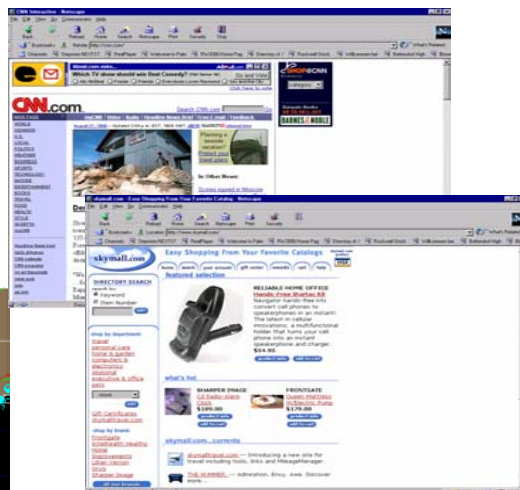
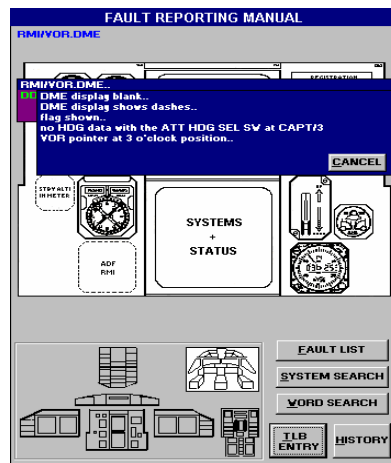
## Flight Deck

- Graphical Weather
- Charts and Maps
- Electronic Manuals
- Performance Calc.
  - Weight and balance
  - Take-Off Data
  - Airline Manuals
- Electronic Logbook
- Graphical Fault Reporting



## Maintenance

- Virtual QAR (FOQA Data)
- Electronic Logbook
- Graphical Fault Reporting
- Maintenance Manuals
- 615 Data Load
- IFE BITE Downlink
- Equipment Lists
  - Parts Ordering



## Passenger

- Passenger E-mail
- Internet
- Electronic Duty Free Shopping
- Reservations & Ticketing
- Surveys & Statistics

## Cabin Crew

- Cabin Management
  - Passenger Manifest
  - Frequent Flyer Information
- Electronic Manuals
- Passenger/baggage Reconciliation
- Inventory & Reporting
- Credit Card Validation

# Conclusion

## ■ SITA

- has pioneered the introduction of the VHF and SATCOM ACARS service which is today an integral part of airline operations
- encourages and supports ATS providers to use the ACARS service for the introduction of initial ATS applications
- has actively contributed to the development and validation of AEEC and ICAO CNS/ATM standards
- is in the process of upgrading its entire VHF ACARS infrastructure to provide VDL Mode 2 services
- is prepared for the introduction of ATS services over ATN/VDL Mode 2
- committed to working with airlines and ATS providers to ensure that CNS/ATM becomes a reality
- committed to continuing to evolve its service offerings to beyond the AOA/ATN

# Contact Information

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